

WHAT IS CLAIMED IS:

1. An optical fiber component for Raman amplification, comprising:

an optical fiber for Raman-amplifying signal light  
5 of a plurality of channels of mutually different wavelengths;  
and

a device, inserted at a predetermined position in said optical fiber for Raman amplification, selectively attenuating by 10 dB or more light that propagates in an  
10 opposite direction to the signal light,

wherein said device is inserted at a position where an effective deterioration amount of an optical SN ratio produced by DRBS-XT (Double Rayleigh Back Scattering-Crosstalk), at a signal output terminal of said  
15 optical fiber for Raman amplification, becomes 1 dB or less.

2. An optical fiber component for Raman amplification according to claim 1, wherein, when an effective length of said optical fiber for Raman amplification at a wavelength of pumping light is taken as  
20 1, said device is arranged at a position separated by a predetermined distance from an input position of the pumping light such that the effective length seen from the input position becomes 0.4 to 0.6.

3. An optical fiber component for Raman  
25 amplification according to claim 1, wherein, when a gain obtained by said optical fiber for Raman amplification as

a whole is taken as 1, said device is arranged at a position separated by a predetermined distance from a signal input terminal such that a gain of 0.4 to 0.6 can be obtained in a gain distribution along a longitudinal direction of said optical fiber for Raman amplification.

4. A Raman amplifier including an optical fiber component for Raman amplification according to claim 1.

5. A Raman amplifier according to claim 4, further comprising:

a pumping light source for supplying pumping light for generating Raman gain in a predetermined wavelength band in said optical fiber for Raman amplification; and

a multiplexing structure for guiding the pumping light from said pumping light source into said optical fiber for Raman amplification.

6. A Raman amplifier according to claim 4, wherein, when a Raman gain coefficient of said optical fiber for Raman amplification is taken as  $g_R$  and an effective area is taken as  $A_{eff}$ , a ratio  $g_R/A_{eff}$  of the Raman coefficient with respect to the effective area of said optical fiber for Raman amplification at a wavelength of pumping light is 5 (1/Wkm) or more.

7. An optical communications system including a Raman amplifier according to claim 4.

8. An optical fiber component for Raman amplification, comprising:

an optical fiber for Raman-amplifying signal light  
 of a plurality of channels of mutually different wavelengths;  
 and

a device, inserted at a predetermined position in said  
 5 optical fiber for Raman amplification, selectively  
 attenuating by 10 dB or more light that propagates in an  
 opposite direction to the signal light,

wherein said device is inserted at a position where  
 an absolute value  $|MPI-XT|$  of MPI (Multi-Line Interference)  
 10 crosstalk at a signal output terminal of said optical fiber  
 for Raman amplification and an optical SN ratio OSNR satisfy  
 the condition:

$$0 \leq \log ((|MPI-XT| + OSNR) / |MPI-XT|) \leq 0.1$$

9. An optical fiber component for Raman  
 15 amplification according to claim 8, wherein, when an  
 effective length of said optical fiber for Raman  
 amplification at a wavelength of pumping light is taken as  
 1, said device is arranged at a position separated by a  
 predetermined distance from an input position of the pumping  
 20 light such that the effective length seen from the input  
 position becomes 0.4 to 0.6.

10. An optical fiber component for Raman  
 amplification according to claim 8, wherein, when a gain  
 obtained by said optical fiber for Raman amplification as  
 25 a whole is taken as 1, said device is arranged at a position  
 separated by a predetermined distance from a signal input

terminal such that a gain of 0.4 to 0.6 can be obtained in a gain distribution along a longitudinal direction of said optical fiber for Raman amplification.

11. A Raman amplifier including an optical fiber  
5 component for Raman amplification according to claim 8.

12. A Raman amplifier according to claim 11, further comprising:

a pumping light source for supplying pumping light for generating Raman gain in a predetermined wavelength band  
10 in said optical fiber for Raman amplification; and

a multiplexing structure for guiding the pumping light from said pumping light source into said optical fiber for Raman amplification.

13. A Raman amplifier according to claim 11, wherein,  
15 when a Raman gain coefficient of said optical fiber for Raman amplification is taken as  $g_R$  and an effective area is taken as  $A_{eff}$ , a ratio  $g_R/A_{eff}$  of the Raman coefficient with respect to the effective area of said optical fiber for Raman amplification at a wavelength of pumping light becomes 5  
20  $(1/Wkm)$  or more.

14. An optical communications system including a Raman amplifier according to claim 11.

15. An optical fiber component for Raman amplification, comprising:

25 an optical fiber for Raman-amplifying signal light of a plurality of channels of mutually different wavelengths;

and

a device, inserted at a predetermined position in said optical fiber for Raman amplification, selectively attenuating by 10 dB or more light that propagates in an opposite direction to the signal light,

wherein said device is inserted at a position where an absolute value  $|DRBS-XT|$  of DRBS-XT (Double Rayleigh Back Scattering-Crosstalk) at a signal output terminal of said optical fiber for Raman amplification and an optical SN ratio OSNR satisfy the following condition:

$$0 \leq \log ((|DRBS-XT| + OSNR) / |DRBS-XT|) \leq 0.1$$

16. An optical fiber component for Raman amplification according to claim 15, wherein, when an effective length of said optical fiber for Raman amplification at a wavelength of pumping light is taken as 1, said device is arranged at a position separated by a predetermined distance from an input position of the pumping light such that the effective length seen from the input position becomes 0.4 to 0.6.

17. An optical fiber component for Raman amplification according to claim 15, wherein, when a gain obtained by said optical fiber for Raman amplification as a whole is taken as 1, said device is arranged at a position separated by a predetermined distance from a signal input terminal such that a gain of 0.4 to 0.6 can be obtained in a gain distribution along a longitudinal direction of said

optical fiber for Raman amplification.

18. A Raman amplifier including an optical fiber component for Raman amplification according to claim 15.

19. A Raman amplifier according to claim 18, further comprising:

a pumping light source for supplying pumping light for generating Raman gain in a predetermined wavelength band in said optical fiber for Raman amplification; and

a multiplexing structure for guiding the pumping light from said pumping light source into said optical fiber for Raman amplification.

20. A Raman amplifier according to claim 18, wherein, when a Raman gain coefficient of said optical fiber for Raman amplification is taken as  $g_R$  and an effective area is taken as  $A_{eff}$ , a ratio  $g_R/A_{eff}$  of the Raman coefficient with respect to the effective area of said optical fiber for Raman amplification at a wavelength of pumping light is 5 (1/Wkm) or more.

21. An optical communications system including a Raman amplifier according to claim 18.